New York ISO
Independent System Operator

2023-2042 System & Resource Outlook Update

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Electric System Planning Working Group (ESPWG)

April 4, 2024, NYISO

Reposted April 4, 2024

Agenda

- Scope & Schedule Review
- Reference Case Updates
  - Contract Case
  - Policy Case
    - Capacity Expansion Scenario Results
    - Capacity Expansion Sensitivity Analysis
- Next Steps
- Outlook Data Catalog
- Appendix
  - Updated Contract Case Renewable Pockets
  - Lower/Higher Demand Policy Case Results

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Supplemental Material Posted

- In addition to this slide deck, an excel spreadsheet with input data assumed as forecasts for the 2023-2042 System & Resource Outlook has been posted with the meeting materials

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Scope & Schedule Review

System & Resource Outlook Scope

Model Development

- Benchmark
- Assumptions
- Reference Cases
- Sensitivities

Congestion Assessment

- Historic & Future Transmission Congestion
- Congestion Relief Analysis

Analyses

- Resources to Meet Policy Objectives
- Renewable Pockets & Energy Deliverability
- Renewable Generation Profiles
- Future Resource Attributes

Report, Appendix, Data Catalog, & Fact Sheet

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Preliminary Targeted Study Schedule

2024 Q1	Month	January					February				March			
	Week	1	2	3	4	5	1	2	3	4	1	2	3	4
	~~Benchmarking~~													
	~~Assumptions Development~~													
	Capacity Expansion Model Development	X	X	X	X	X	X	X	X	X				
	Capacity Expansion Results & Analyses						X	X	X	X	X	X	X	X
	Production Cost Model Development	X	X	X	X	X	X	X	X	X	X	X	X	X
	Production Cost Results & Analyses	X	X	X	X	X	X	X	X	X	X	X	X	X

2024 Q2	Month	April					May				June			
	Week	1	2	3	4	5	1	2	3	4	1	2	3	4
	Capacity Expansion Model Development													
	Capacity Expansion Results & Analyses													
	Production Cost Model Development													
	Production Cost Results & Analyses	X	X	X	X	X								
	Sensitivities	X	X	X	X	X								
	Report	X	X	X	X	X	X	X	X	X	X	X	X	X

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Contract Case

Contract Case Results

- Contract Case lockdown date 10/30/2023
- Preliminary Contract Case results were presented at the 2/22/2024 ESPWG
- The following incremental changes have been made to the Contract Case model:
  - Based on stakeholder feedback, proposed PARs as part of the Phase 1 and 2 transmission upgrades were scheduled to hold flows as proposed by utilities to maximize use of upgraded transmission paths.
- Results from the updated Contract Case are consistent with preliminary Contract Case results and trends presented at the 2/22/2024 ESPWG meeting
- Final results for the Contract Case renewable pockets for the 2023-2042 Outlook are included in the Appendix of this presentation
  - The full suite of results will be included in the System & Resource Outlook report and appendices

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Policy Case:
Capacity Expansion Scenario Results

Capacity Expansion Scenarios

- **The Policy Case for the 2023-2042 Outlook includes three scenarios**
  - Results for the Lower Demand & Higher Demand Policy Case scenarios were presented at the 3/21 ESPWG
  - Results for the State Scenario are included in this slide deck
- **The three scenarios have a similar model framework (e.g., study years, time representation methodology, transmission network, external area representation, etc.)**
- **Each scenario has a unique evolving 20-year hourly energy forecast to represent a variety of potential future conditions**
  - For example, annual energy, peak demand, large loads, BTM solar forecasts
  - Each scenario has unique ELCC curves based on the respective net load
- **Detailed assumptions are included in the capacity expansion model assumptions matrix**

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State Scenario Updates

- **The State Scenario was re-run to include the flexible load modeling per NYSERDA and DPS request and to enforce age-based fossil retirements exclusively**
  - Assumptions on flexible load modeling were informed by the Integration Analysis
- **Updated results for the State Scenario are included on the following slide**
- **Overall, the trends remain consistent with previously presented results at 3/21/2024 ESPWG**
  - The addition of flexible loads with contributing firm capacity reduces the need for 3.7 GW of new capacity
  - Updated generator retirement assumption modifies the transition of fossil retirements but leads to same results by the end of the study period

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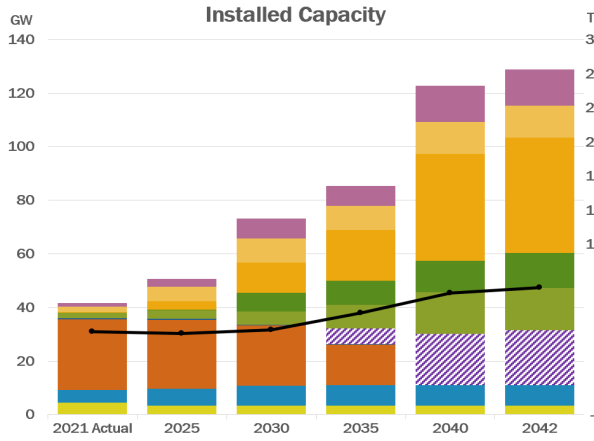
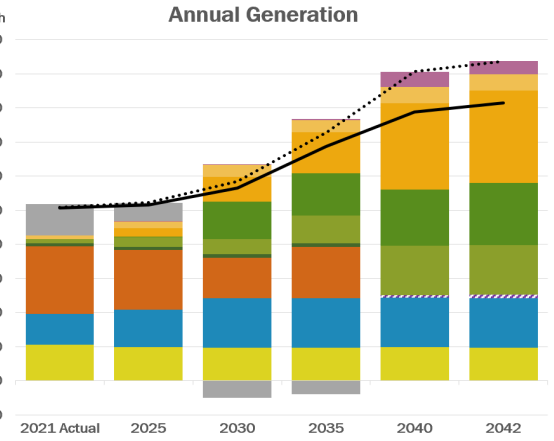
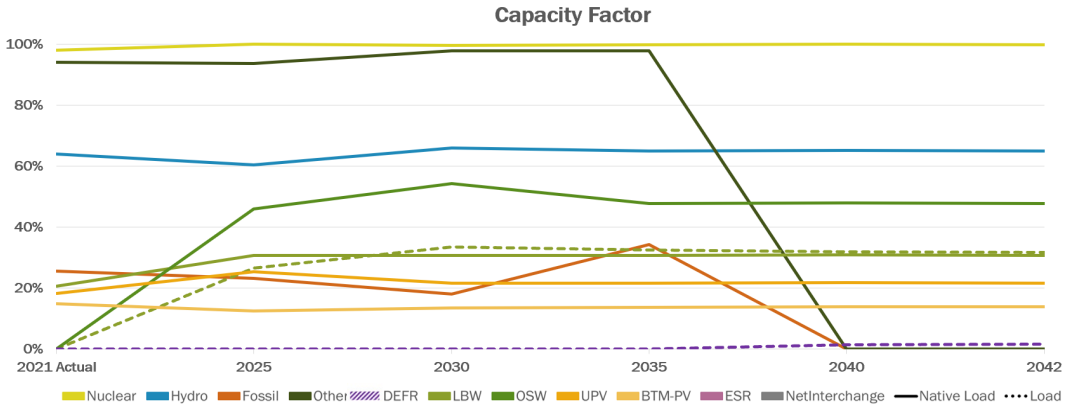
State Scenario Policy Case







Capacity (Summer MW)	2021	2025	2030	2035	2040	2042
Nuclear	4,378	3,342	3,342	3,342	3,342	3,342
Fossil	26,345	25,753	22,424	15,022	-	-
DEFR - New CC	-	-	-	-	-	-
DEFR - New CT	-	-	-	3,163	7,944	8,574
DEFR - Retrofit CC	-	-	-	88	6,548	7,458
DEFR - Retrofit CT	-	-	-	2,676	4,558	4,558
Hydro	4,868	6,294	7,544	7,665	7,665	7,665
LBW	2,227	3,291	4,781	8,704	15,549	15,770
OSW	-	136	6,990	9,000	11,779	13,021
UPV	32	3,135	11,293	18,892	39,903	42,903
BTM-PV	2,116	5,384	8,972	8,973	12,019	12,019
Storage	1,405	2,905	7,405	7,405	13,489	13,489
Total (Summer MW)	41,686	50,562	73,074	85,254	122,797	128,799
Annual Peak (MW)	30,397	29,568	29,861	37,047	45,062	47,046

Generation (GWh)	2021	2025	2030	2035	2040	2042
Nuclear	31,609	29,276	29,174	29,191	29,314	29,211
Fossil	59,154	52,446	35,524	45,119	-	-
DEFR - New CC	-	-	-	-	-	-
DEFR - New CT	-	-	-	-	38	32
DEFR - Retrofit CC	-	-	-	-	2,324	2,908
DEFR - Retrofit CT	-	-	-	-	5	3
Hydro	27,379	33,265	43,612	43,621	43,703	43,575
LBW	4,024	8,747	13,341	24,398	43,177	43,609
OSW	-	549	33,182	37,613	49,447	54,371
UPV	51	6,987	21,456	35,932	75,983	81,340
BTM-PV	2,761	5,871	10,610	10,812	14,589	14,648
Storage	355	867	503	622	13,151	11,505
Total Generation	127,930	140,761	191,250	232,579	276,327	286,549
RE Generation	34,570	56,286	122,704	152,998	240,050	249,047
ZE Generation	66,179	85,562	151,878	182,189	271,732	281,201
Net Interchange	27,222	16,043	(15,091)	(11,768)	-	-
Load	151,979	154,839	169,374	206,351	236,258	244,484
Load+Charge	152,334	156,699	175,077	218,304	271,732	281,201
Electrolysis Load	-	893	5,274	11,391	20,793	24,036
Load Flexed by EV's	-	105	1,082	2,507	4,600	5,352
% RE [RE/Load+Charge]	23%	36%	70%	70%	88%	89%
% ZE [ZE/(Load+Charge)]	43%	55%	87%	83%	100%	100%

Emissions (million tons)	2021	2025	2030	2035	2040	2042
CO_2 Emissions	22.24	22.17	14.88	19.05	-	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing (77 MW) and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR)
* Net Interchange is reported relative to New York (imports +, exports -)
* Load+Charge includes electrolysis load

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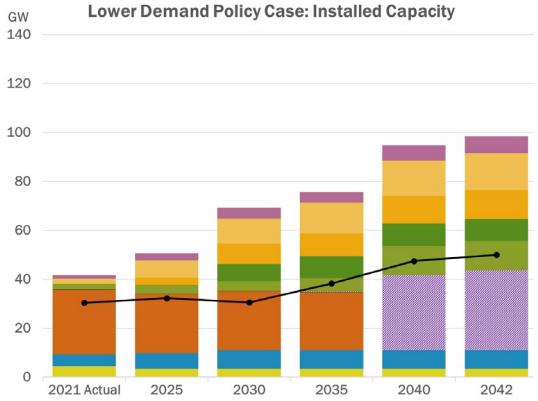
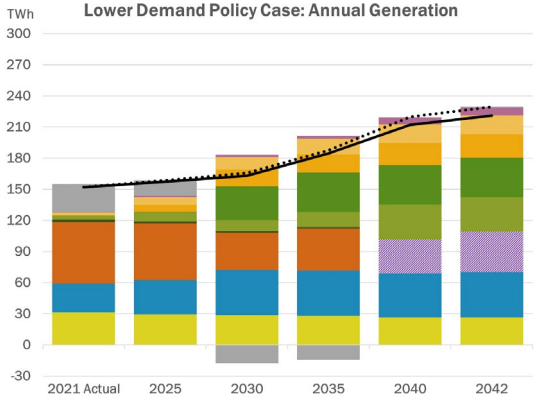
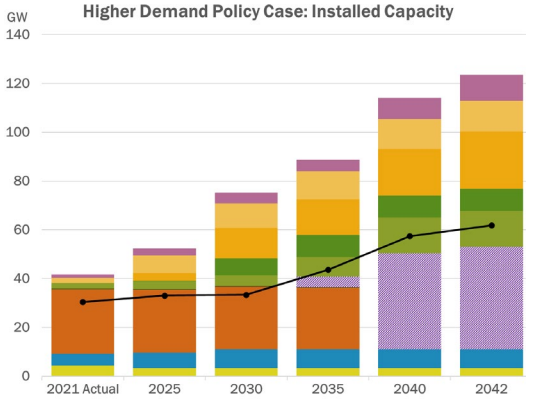
Capacity Expansion Results Comparison

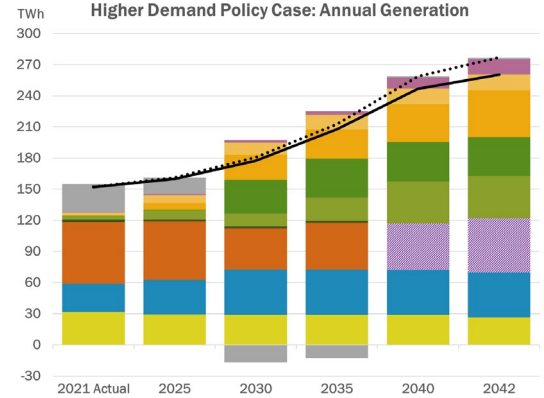
Lower Demand Policy Case



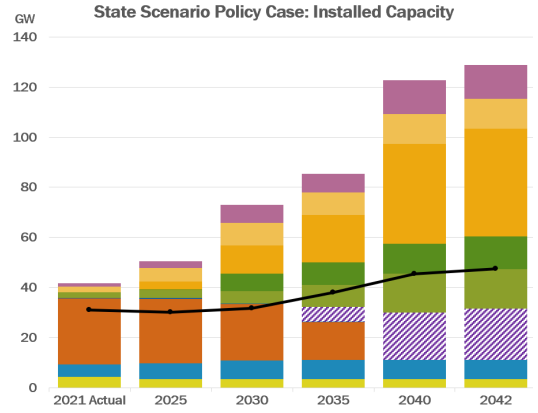


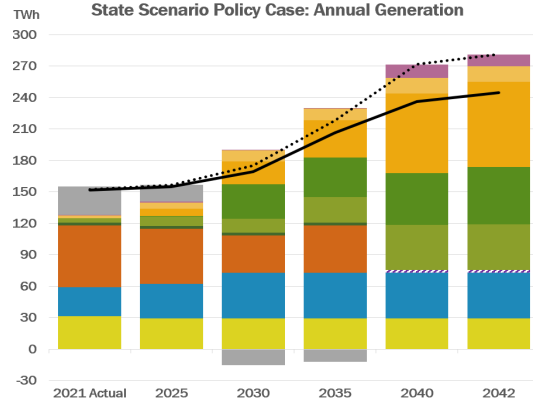
Higher Demand Policy Case





State Scenario Policy Case





Nuclear Hydro Fossil Other DEFR LBW OSW UPV BTM-PV ESR NetInterchange Native Load Load

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Policy Case:

Capacity Expansion Sensitivity Analysis

Capacity Expansion Sensitivity Analysis

- As part of the 2023-2042 Outlook, the NYISO will conduct sensitivity analysis in the capacity expansion model to assess key drivers for resource mix and impacts on projected resource growth
  - A sensitivity is intended to show the impact on results of a single relatively small assumption change to a reference case
  - An example of sensitivity analysis is included on the following slide
- A preliminary list of proposed sensitivities for this Outlook is included in this slide deck for stakeholder consideration
- The NYISO is seeking feedback from stakeholders on parameters/assumptions for potential sensitivity analysis for the Outlook
  - A limited number of sensitivities will be evaluated
  - Some sensitivities may be considered in production cost modeling, time permitting

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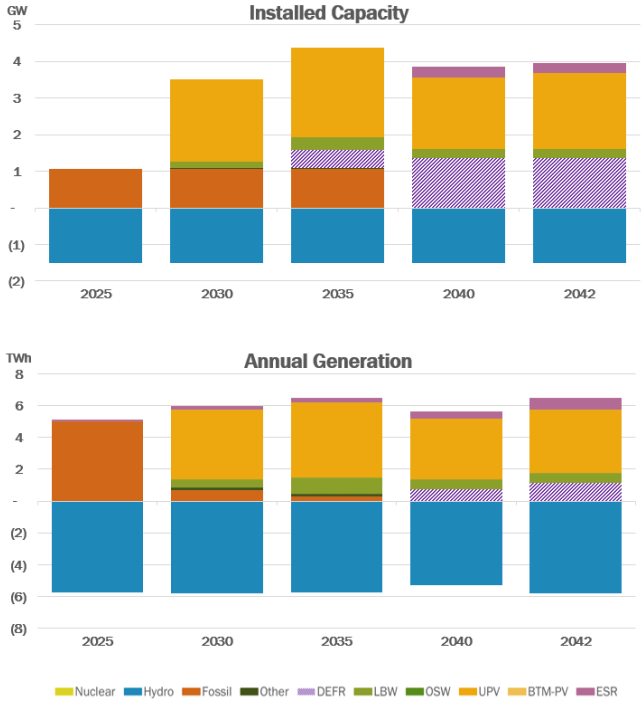
Example: HQ Import Reduction Sensitivity

- **The figure on the right includes results for the sensitivity analysis to assume a reduction in HQ imports (net zero imports in Zone D), as proposed at the 1/23/2024 ESPWG**
  - Results show that the reduction in imports of hydro generation leads to a net increase in zero emitting generation capacity from candidate resources in the NYCA



Capacity Delta (Summer GW)

	2025	2030	2035	2040	2042
Nuclear	-	-	-	-	-
Fossil	1.1	1.1	1.1	-	-
DEFR - HcLo	-	-	-	0.1	0.2
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	0.5	1.2	1.2
Hydro	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)
LBW	-	0.2	0.3	0.2	0.2
OSW	-	-	-	-	-
UPV	-	2.3	2.5	2.0	2.1
BTM-PV	-	-	-	-	-
Storage	-	-	-	0.3	0.3
Total	(0.4)	2.0	2.9	2.4	2.5

Generation Delta (TWh)

	2025	2030	2035	2040	2042
Nuclear	-	(0.0)	-	(0.0)	(0.0)
Fossil	5.0	0.7	0.3	-	-
DEFR - HcLo	-	-	-	0.4	0.9
DEFR - McMo	-	-	-	-	-
DEFR - LcHo	-	-	0.0	0.3	0.2
Hydro	(5.8)	(5.8)	(5.8)	(5.3)	(5.8)
LBW	-	0.5	1.0	0.6	0.6
OSW	-	-	-	-	-
UPV	-	4.4	4.7	3.8	4.0
BTM-PV	-	-	-	-	-
Storage	0.1	0.2	0.3	0.4	0.7
Total Generation	(0.7)	0.2	0.7	0.8	0.7
RE Generation	(5.8)	(0.9)	-	(0.8)	(1.1)
ZE Generation	(5.8)	(0.9)	0.0	(0.1)	0.0
Load	-	-	-	-	-
Load+Charge	0.1	0.3	0.4	0.5	0.8
% RE [RE/Load]	-4%	-1%	0%	0%	-1%
% ZE [ZE/(Load+Charge)]	-4%	-1%	0%	0%	0%

Emissions Delta (million tons)

	2025	2030	2035	2040	2042
CO_2 Emissions	2.26	0.33	0.16	-	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Renewable (RE), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo), Medium Capital Medium Operating (McMo), Low Capital High Operating (LcHo)

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List of Proposed Sensitivities

- HQ import reduction
  - Example is shown in the previous slide
- Flexible load modeling
- Annual build limitations
- Analysis of large load impacts
- CO_2 emissions price forecast
- Prescribed nuclear retirements
- Capacity margin targets adjustment
- Additional suggestions from stakeholders?

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Next Steps

Next Steps

- Seek stakeholder feedback
- Continue model development of Policy Case scenarios in the production cost model
- Continue renewable pockets analyses for the Policy Case
- Conduct sensitivity analysis in capacity expansion model
- Continue stakeholder engagement
  - Return to ESPWG in April 2024

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Questions, Comments, & Feedback?

Email additional feedback to:
SCarkner@nyiso.com
one week prior the next ESPWG

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2023-2042 System & Resource Outlook Data Catalog

Report

Report Placeholder

Study Summary

Summary Placeholder

Report Appendices

Production Cost Model Benchmark DRAFT
Production Cost Assumptions Matrix DRAFT
Capacity Expansion Assumptions Matrix DRAFT

Data Documents

Stakeholder Presentations

November 18, 2022
- 2021 Outlook Lessons Learned
- NYSERDA Outlook Suggestions

June 16, 2023
- 2023-2042 Outlook Kickoff

July 17, 2023
- 2023-2042 Outlook Benchmark
- 2023-2042 Outlook Update

August 22, 2023
- 2023-2042 Outlook Preliminary Reference Case Assumptions

September 21, 2023
- 2023-2042 Outlook Reference Case Assumptions Update

October 24, 2023
- 2023-2042 Outlook Reference Case Assumptions Update

November 2, 2023
- 2023-2042 Outlook Reference Case Assumptions Update & Preliminary Base Case Results

November 21, 2023
- 2023-2042 Outlook Reference Case Updates

December 19, 2023
- 2023-2042 Outlook Reference Case Updates & Preliminary Contract Case Results

January 23, 2024
- 2023-2042 Outlook Reference Case Updates

February 22, 2024
- 2023-2042 Outlook Reference Case Updates & Final Base & Contract Case Results

March 1, 2024
- 2023-2042 Outlook Preliminary Renewable Pocket Analysis & Preliminary Capacity Expansion Scenario Results

March 21, 2024
- 2023-2042 Outlook Policy Case Updates

2021-2040 System & Resource Outlook Data Catalog

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Appendix

Updated Contract Case Renewable Pockets

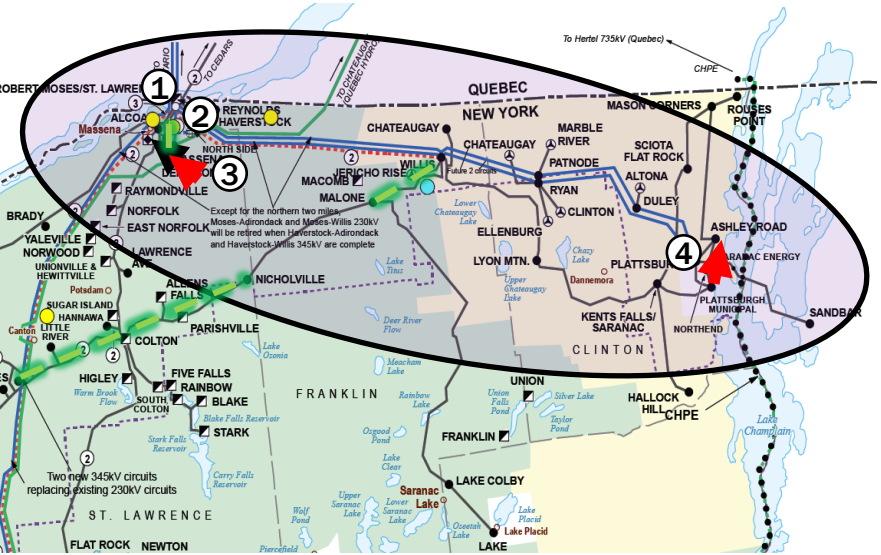
Pocket X1

North Country: Northern Area

Black arrows represent lines congested in the current 2023-2042 Outlook and/or prior 2021-2040 Outlook Contract Case that meets the 100 congested hours criteria

Red arrows and numbers represent lines only congested in the 2021-2040 Outlook Contract Case

Green highlights represent Phase 1 and 2 transmission upgrades



ID	Constraint	Number of Limiting Hours	
		2023 Outlook Contract Case	2021 Outlook Contract Case
1	North Tie OH-NY	6,561	7,678
2	MOSES W 230.00-MNH3230 230.00	883	-
3	ALCOA-NM 115-DENNISON 115	22	782
4	NOEND115 115-PLAT 115 115	-	128

Type	Capacity (MW)		Energy Deliverability (%)	
	2023 Outlook Contract Case	2021 Outlook Contract Case	2023 Outlook Contract Case	2021 Outlook Contract Case
Hydro	1155	1049	98%	100%
Wind	977	876	93%	100%
Solar	690	180	89%	100%

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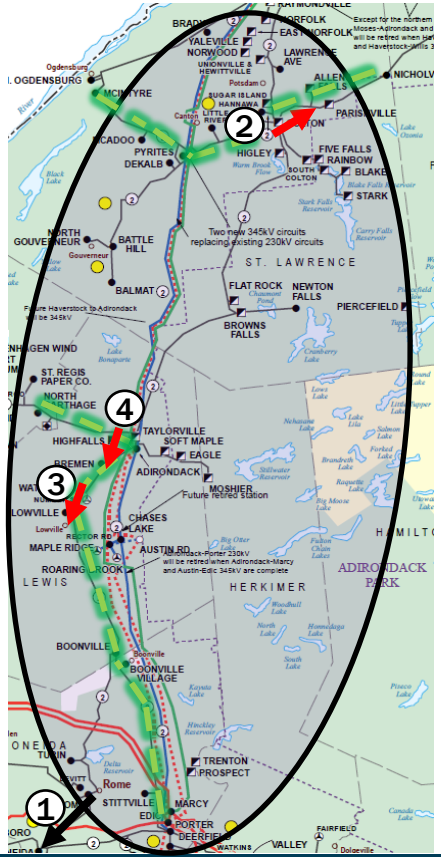
Pocket X2

Northern NY: Mohawk Valley Area

Black arrows represent lines congested in the current 2023-2042 Outlook and/or prior 2021-2040 Outlook Contract Case that meets the 100 congested hours criteria

Red arrows and numbers represent lines only congested in the 2021-2040 Outlook Contract Case

Green highlights represent Phase 1 and 2 transmission upgrades



ID	Constraint	Number of Limiting Hours	
		2023 Outlook Contract Case	2021 Outlook Contract Case
1	TRNG STN 115.00-STERLING 115.00	200	-
2	NICHOLVL 115-PARISHVL 115	-	515
3	LOWVILLE 115-Q531_POI 115	-	434
4	BREMEN 115-Q531_POI 115	-	182

Type	Capacity (MW)		Energy Deliverability (%)	
	2023 Outlook Contract Case	2021 Outlook Contract Case	2023 Outlook Contract Case	2021 Outlook Contract Case
Hydro	252	250	97%	100%
Wind	505	505	96%	100%
Solar	80	35	92%	96%

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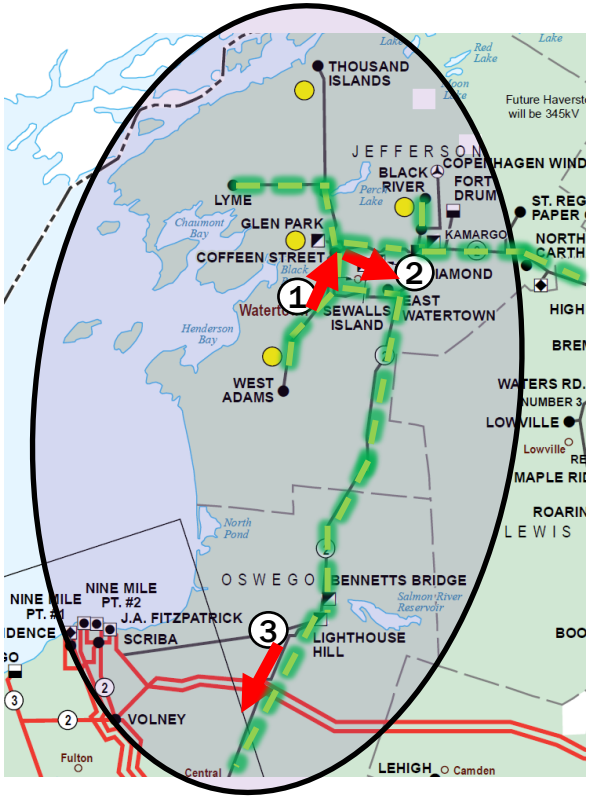
Pocket X3

Northern NY: Ontario Area

Black arrows represent lines congested in the current 2023-2042 Outlook and/or prior 2021-2040 Outlook Contract Case that meets the 100 congested hours criteria

Red arrows and numbers represent lines only congested in the 2021-2040 Outlook Contract Case

Green highlights represent Phase 1 and 2 transmission upgrades



ID	Constraint	Number of Limiting Hours	
		2023 Outlook Contract Case	2021 Outlook Contract Case
1	COFFEEN 115-GLEN PRK 115	-	1,119
2	COFFEEN 115-E WTRTWN 115	-	748
3	HTHSE HL 115-MALLORY 115	-	591

Type	Capacity (MW)		Energy Deliverability (%)	
	2023 Outlook Contract Case	2021 Outlook Contract Case	2023 Outlook Contract Case	2021 Outlook Contract Case
Hydro	224	155	98%	99%
Wind	80	80	98%	100%
Solar	469	369	99%	90%

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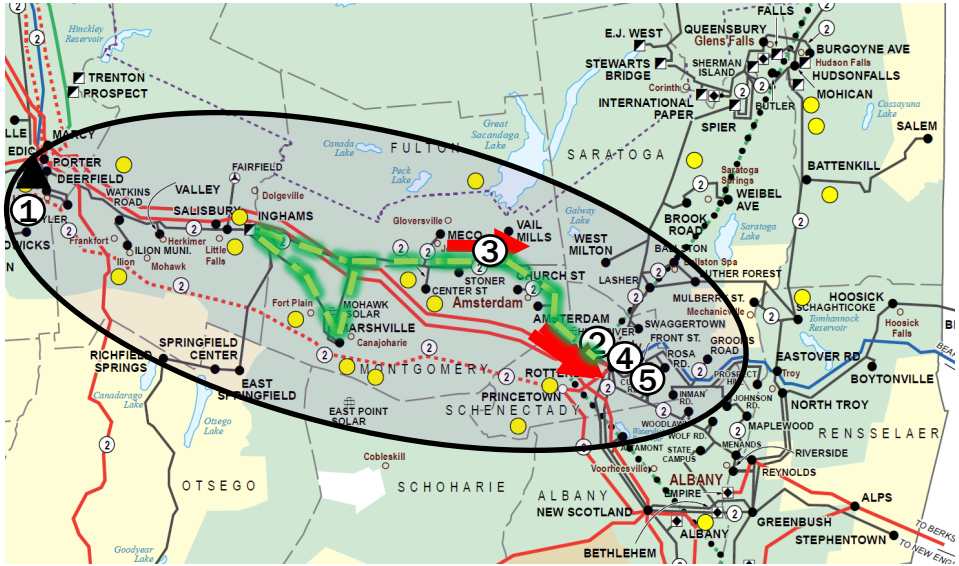
Pocket Y1

Capital Region: Mohawk Valley Area

Black arrows represent lines congested in the current 2023-2042 Outlook and/or prior 2021-2040 Outlook Contract Case that meets the 100 congested hours criteria

Red arrows and numbers represent lines only congested in the 2021-2040 Outlook Contract Case

Green highlights represent Phase 1 and 2 transmission upgrades



ID	Constraint	Number of Limiting Hours	
		2023 Outlook Contract Case	2021 Outlook Contract Case
1	DEERFD-H 115.00-PORTER 1 115.00	904	-
2	RTRDM1 115-Q638POI 115	-	1,200
3	STONER 115-VAIL TAP 115	-	882
4	AMST 115 115-Q638POI 115	-	302
5	Q638POI 115-AMST 115 115	-	293

Type	Capacity (MW)		Energy Deliverability (%)	
	2023 Outlook Contract Case	2021 Outlook Contract Case	2023 Outlook Contract Case	2021 Outlook Contract Case
Hydro	32	30	94%	100%
Wind	74	74	99%	97%
Solar	1,700	961	94%	96%

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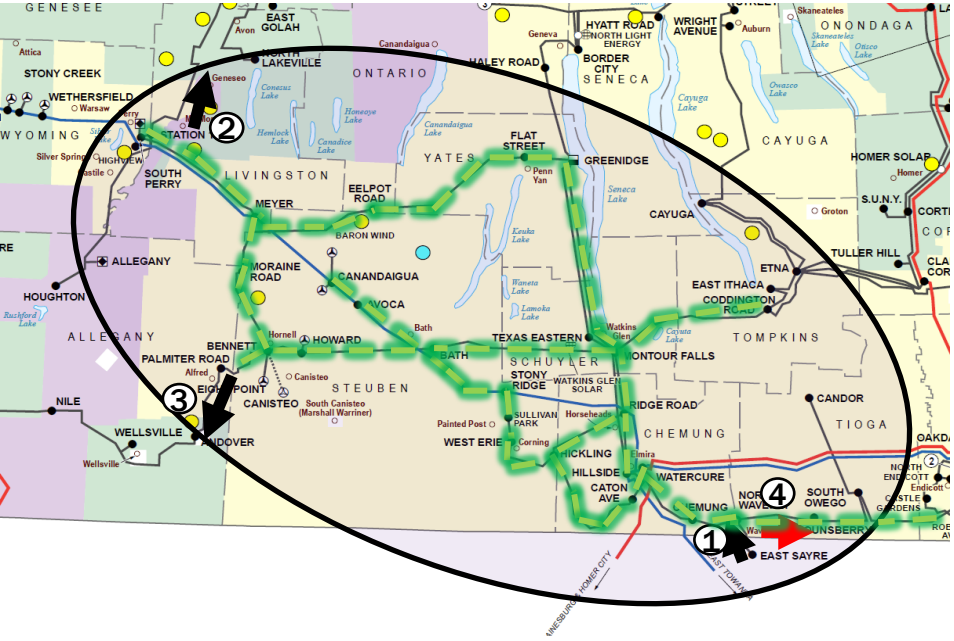
Pocket Z1

Southern Tier: Finger Lakes Area

Black arrows represent lines congested in the current 2023-2042 Outlook and/or prior 2021-2040 Outlook Contract Case that meets the 100 congested hours criteria

Red arrows and numbers represent lines only congested in the 2021-2040 Outlook Contract Case

Green highlights represent Phase 1 and 2 transmission upgrades



ID	Constraint	Number of Limiting Hours	
		2023 Outlook Contract Case	2021 Outlook Contract Case
1	N.WAV115 115.00-26E.SAYR 115.00	4,247	3,225
2	S.PER115 115.00-STA 158S 115.00	1,032	-
3	PALMT115 115.00-ANDOVER1 115.00	251	-
4	LOUNS115 115-STAGECOA 115	-	170

Type	Capacity (MW)		Energy Deliverability (%)	
	2023 Outlook Contract Case	2021 Outlook Contract Case	2023 Outlook Contract Case	2021 Outlook Contract Case
Wind	691	720	100%	100%
Solar	927	405	99%	100%

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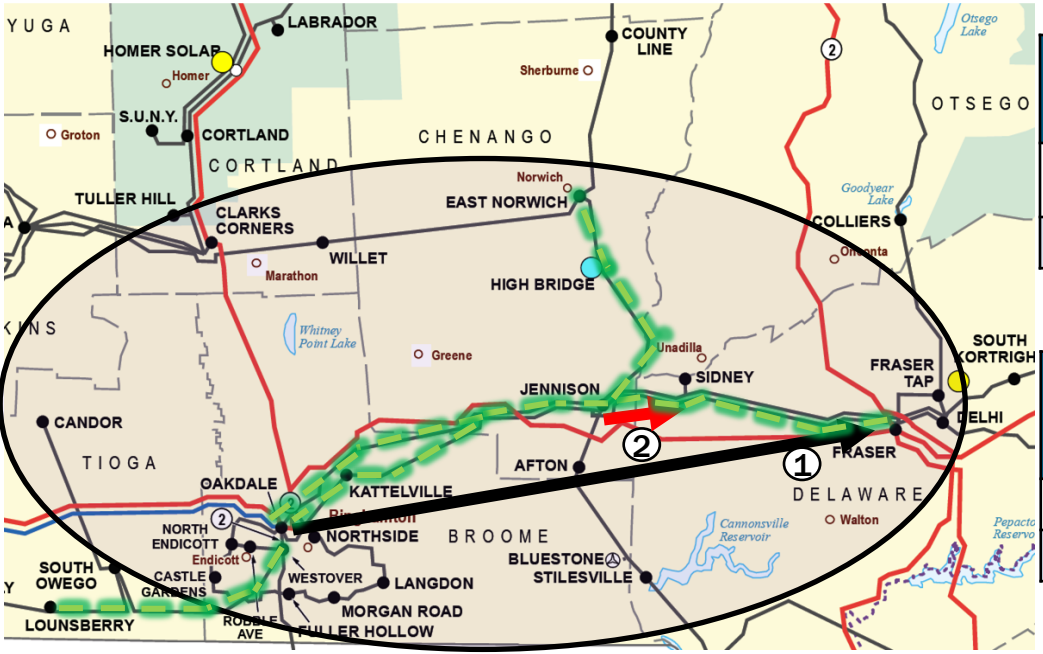
Pocket Z2

Southern Tier: Binghamton Area

Black arrows represent lines congested in the current 2023-2042 Outlook and/or prior 2021-2040 Outlook Contract Case that meets the 100 congested hours criteria

Red arrows and numbers represent lines only congested in the 2021-2040 Outlook Contract Case

Green highlights represent Phase 1 and 2 transmission upgrades



ID	Constraint	Number of Limiting Hours	
		2023 Outlook Contract Case	2021 Outlook Contract Case
1	FRASR345 345.00-OAKDL345 345.00	150	-
2	JENN 115 115-SIDNT115 115	-	542

Type	Capacity (MW)		Energy Deliverability (%)	
	2023 Outlook Contract Case	2021 Outlook Contract Case	2023 Outlook Contract Case	2021 Outlook Contract Case
Wind	213	213	100%	99%
Solar	205	60	97%	100%

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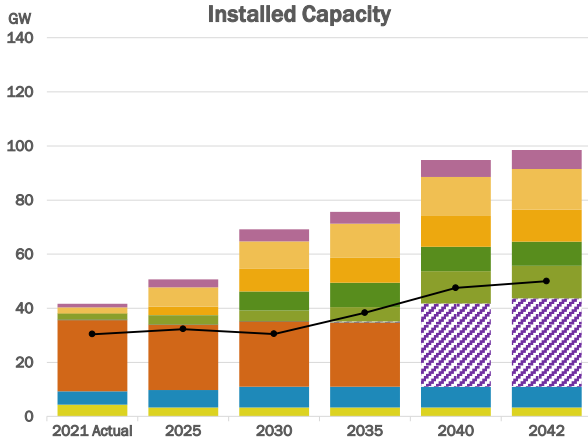
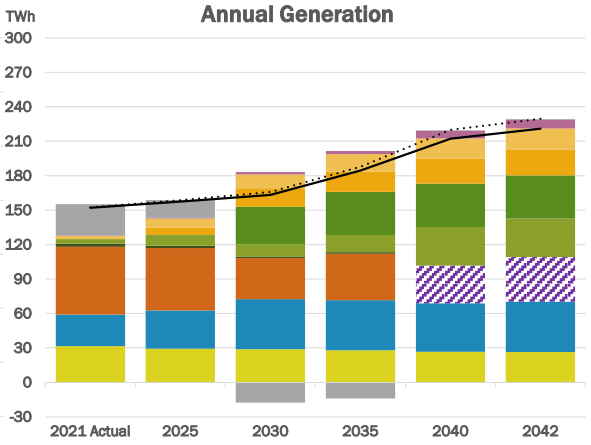
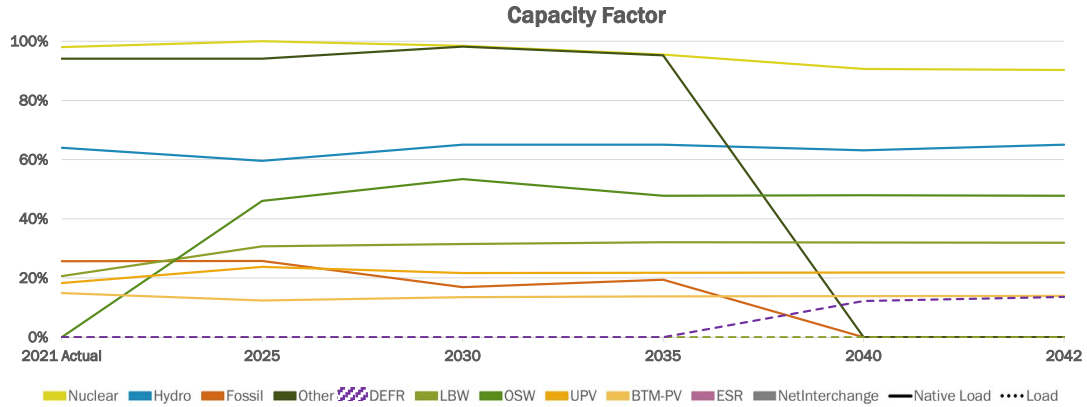
Capacity Expansion Scenario Results

Lower Demand Policy Case







Capacity (Summer MW)	2021	2025	2030	2035	2040	2042
Nuclear	4,378	3,342	3,342	3,342	3,342	3,342
Fossil	26,345	24,122	24,122	23,666	-	-
DEFR - HcLo	-	-	-	-	5,042	5,042
DEFR - McMo	-	-	-	-	-	-
DEFR - LcHo	-	-	-	235	25,655	27,606
Hydro	4,868	6,381	7,665	7,665	7,665	7,665
LBW	2,227	3,291	3,881	5,325	12,000	12,000
OSW	-	136	6,990	9,000	9,000	9,000
UPV	32	3,135	8,422	9,204	11,365	11,821
BTM-PV	2,116	7,097	10,153	12,644	14,444	14,988
Storage	1,405	2,905	4,405	4,405	6,262	7,044
Total (Summer MW)	41,686	50,650	69,147	75,652	94,775	98,508
Annual Peak (MW)	30,397	32,279	30,490	38,297	47,493	49,967

Generation (GWh)	2021	2025	2030	2035	2040	2042
Nuclear	31,609	29,276	28,831	27,950	26,544	26,438
Fossil	59,154	54,403	35,687	40,342	-	-
DEFR - HcLo	-	-	-	-	30,606	35,116
DEFR - McMo	-	-	-	-	-	-
DEFR - LcHo	-	-	-	-	2,168	3,880
Hydro	27,379	33,281	43,688	43,687	42,408	43,686
LBW	4,024	8,841	10,700	14,971	33,660	33,536
OSW	-	549	32,708	37,648	37,806	37,649
UPV	51	6,528	15,991	17,569	21,759	22,603
BTM-PV	2,761	7,718	12,024	15,232	17,582	18,311
Storage	355	1,064	2,171	2,805	6,530	7,494
Total Generation	127,930	143,650	183,233	201,596	219,062	228,715
RE Generation	34,215	56,917	115,110	129,107	153,215	155,785
ZE Generation	65,824	86,192	143,941	157,057	212,532	221,220
Net Interchange	27,222	15,074	(17,674)	(14,109)	478	664
Load	151,979	157,528	163,222	184,439	212,121	220,946
Load+Charge	152,334	158,754	165,738	187,696	219,831	229,631
% RE [RE/Load]	23%	36%	71%	70%	72%	71%
% ZE [ZE/(Load+Charge)]	43%	55%	88%	85%	100%	100%

Emissions (million tons)	2021	2025	2030	2035	2040	2042
CO_2 Emissions	22.24	23.11	15.00	17.07	-	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Renewable (RE), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo), Medium Capital Medium Operating (McMo), Low Capital High Operating (LcHo)
*Net Interchange is reported relative to New York (imports +, exports -)

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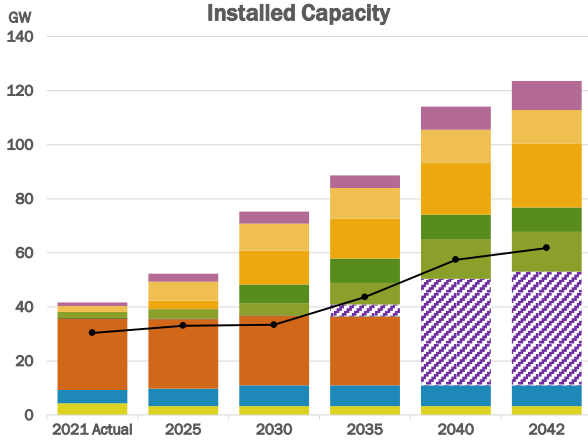

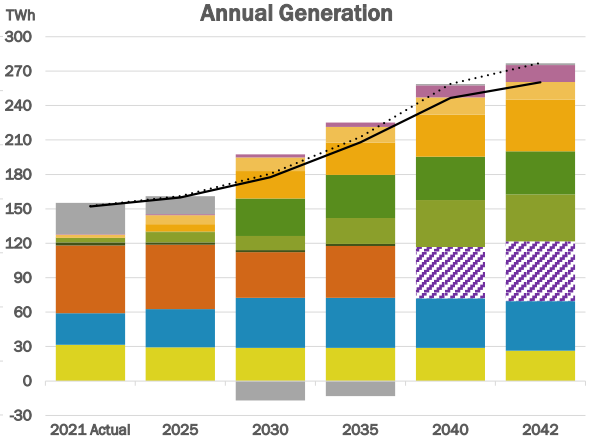

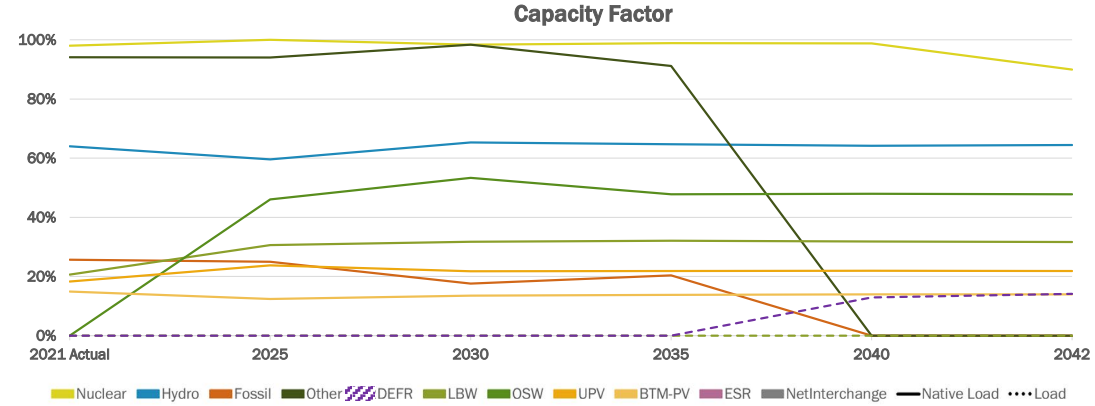

Capacity (Summer MW)	2021	2025	2030	2035	2040	2042
Nuclear	4,378	3,342	3,342	3,342	3,342	3,342
Fossil	26,345	25,753	25,753	25,296	-	-
DEFR - HcLo	-	-	-	-	6,748	7,013
DEFR - McMo	-	-	-	-	-	-
DEFR - LcHo	-	-	-	4,332	32,660	35,033
Hydro	4,868	6,381	7,631	7,665	7,665	7,665
LBW	2,227	3,291	4,403	8,025	14,653	14,750
OSW	-	136	6,990	9,000	9,000	9,000
UPV	32	3,135	12,465	14,692	19,136	23,498
BTM-PV	2,116	7,097	10,032	11,420	12,308	12,567
Storage	1,405	2,905	4,405	4,683	8,547	10,673
Total (Summer MW)	41,686	52,280	75,246	88,680	114,059	123,540
Annual Peak (MW)	30,397	33,063	33,358	43,617	57,436	61,809

Generation (GWh)	2021	2025	2030	2035	2040	2042
Nuclear	31,609	29,276	28,791	28,947	28,929	26,326
Fossil	59,154	56,261	39,737	45,190	-	-
DEFR - HcLo	-	-	-	-	40,724	46,143
DEFR - McMo	-	-	-	-	-	-
DEFR - LcHo	-	-	-	-	3,996	5,948
Hydro	27,379	33,282	43,679	43,422	43,097	43,255
LBW	4,024	8,837	12,239	22,539	40,853	40,869
OSW	-	548	32,661	37,651	37,789	37,650
UPV	51	6,529	23,805	28,155	36,738	44,989
BTM-PV	2,761	7,720	11,880	13,774	15,022	15,399
Storage	355	960	2,679	3,816	10,504	14,806
Total Generation	127,930	145,401	197,415	225,297	257,653	275,387
RE Generation	34,215	56,916	124,264	145,541	173,500	182,163
ZE Generation	65,824	86,192	153,055	174,488	247,149	260,581
Net Interchange	27,222	15,665	(16,983)	(13,095)	970	1,440
Load	151,979	159,991	177,520	207,916	246,751	260,233
Load+Charge	152,334	161,092	180,664	212,476	258,910	277,078
% RE [RE/Load]	23%	36%	70%	70%	70%	70%
% ZE [ZE/(Load+Charge)]	43%	54%	86%	84%	100%	100%

Emissions (million tons)	2021	2025	2030	2035	2040	2042
CO_2 Emissions	22.24	24.04	16.82	19.34	-	-

* Storage includes Pumped Storage Hydro and Batteries
* Utility solar (UPV) includes existing and new UPV
* Hydro includes hydro imports from Hydro Quebec
* Land-Based Wind (LBW), Offshore Wind (OSW), Renewable (RE), Zero Emissions (ZE)
* Dispachable Emission Free Resource (DEFR), High Capital Low Operating (HcLo), Medium Capital Medium Operating (McMo), Low Capital High Operating (LcHo)
*Net Interchange is reported relative to New York (imports +, exports -)

New York ISO

Our Mission & Vision

Mission

Ensure power system reliability and competitive markets for New York in a clean energy future

Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation

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